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Attachment 12

Decommissioning Work Plan
"Concrete Sampling - 183-H Solar Evaporation Basins"
August 26, 1991, Rev. A-3

DECOMMISSIONING WORK PLAN

Hanford Restoration Operations

Surplus Facilities System

CONCRETE SAMPLING - 183-H SOLAR EVAPORATION BASINS

1.0 PURPOSE, SCOPE, AND EXCEPTIONS

This procedure describes the methods and equipment required to core drill the basins' floors and walls for the purpose of obtaining concrete samples for waste designation of the basin concrete per Attachments 1, 2, and 3.

A 2 in. diameter by 5 in. deep core will be taken at each location identified in the Closure Plan for analysis at the K-25 Laboratory. In addition, at two of the specified background locations and at two locations on the floor of each of the basins, an additional 2 in. diameter by 5 in. deep core will be taken for formate analysis at the 325 Laboratory.

Because no organics are being analyzed, no trip blanks are required (per SW846: Test Methods for Evaluating Solid Waste, Section 3.4.1) although they are listed in Table I.B-7. The duplicate samples will be 2 in. diameter by 5 in. deep cores co-located with the original samples and labeled appropriately. This process is needed due to the difficulty in dividing a concrete core into equal portions for quality assurance (QA) purposes accurately in the field.

Taking the co-located duplicate samples will substitute for the originally requested "3 times normal volume" QA checks for the K-25 Laboratory.

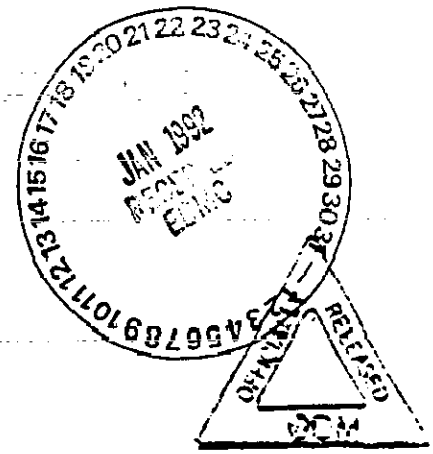
2.0 IMPACT LEVEL

The Impact Level is 3.

3.0 SPECIAL EQUIPMENT

The following list is not meant to be all inclusive, but to indicate some of the special equipment not normally associated with decommissioning activities that may be necessary to perform the work.

- Electric Generator Set
- Core Drill Equipment
- Drill Mounting Bracket
- HILTI Concrete Bolting Equipment (or equivalent)
- Compressed Air
- Coarse sand, silicon carbide, or garnet
- Hoses



3.0 SPECIAL EQUIPMENT (Cont'd)

- ASTM TYPE IV Reagent Grade Water
- Approved grout material; Master Flow 928 Grout

4.0 HEALTH AND SAFETY REQUIREMENTS

4.1 Radiological Control

- WHC-CM-2-14, Hazardous Materials Packaging and Shipping.
- WHC-CM-4-10, Radiation Protection.
- WHC-CM-4-11, ALARA Program.
- WHC-CM-4-13, Operational Health Physics Procedure Manual.
- DO-026-020, Package and Transport Hazardous Waste.
- All work that is described in this Decommissioning Work Plan (DWP) is to be accomplished in accordance with a Radiation Work Permit (RWP) specifically prepared for this project.

4.2 Environmental Controls

- WHC-CM-7-5, Environmental Compliance Manual.

4.3 Industrial Safety

- WHC-CM-4-3 Volumes 1 and 2, Industrial Manual.
- WHC-CM-7-7, Environmental Investigation and Site Characterization Manual, EII 2.1, "Preparation of Hazardous Waste Operating Permits." The primary guidance for site safety related concerns and requirements will be designated in the Hazardous Waste Operations Permit (HWOP). This document will provide guidance for appropriate personnel protection equipment (PPE), site monitoring, chemical/radiological hazards, and potential safety hazards associated with this operation.

4.4 Other Requirements

- WHC-CM-6-7, Environmental Restorations Quality Assurance Program Plan Manual.
- WHC-IP-0136, Decontamination and Decommissioning Records Control Procedure.

5.0 PREPARATORY WORK

Prior to core drilling, many preparatory tasks are required, such as equipment assembly, functional checkouts, and wrapping portions of the equipment to facilitate decontamination.

5.1 Decommissioning Engineering shall determine the sample locations as described in Attachment 1. Each location shall be identified in the field by Decommissioning Engineering.

NOTE - Repeat steps 5.2, 5.3 and 5.4 at each sample location.

Collect background samples on the exterior south wall of the basin prior to moving the drill rig and equipment into the basins. See Figure 1-7 for locations.

5.2 Install a HILTI anchor bolt at each sampling location to be used to anchor the drill rig to the concrete surface that is to be sampled. This step may be performed in advance of the actual sampling effort as directed by the HFO Field Supervisor.

5.3 Assemble the core drill rig, attach 2-inch diameter core drill bit onto the spindle and mount the rig on the base. Core drill bits shall be marked to indicate 5-inch penetration and be decontaminated (per Attachment 3) prior to each use at a new location. A 5-inch penetration is initially specified because this is expected to provide adequate material for analysis. This depth of penetration may be changed based on experience gained by the Field Team Leader and documented in the Field Logbook.

5.4 Connect the drill rig base to the concrete surface per the manufacturers recommendations and the Hilti bolt installed in step 5.2. Verify that a Ground Fault Interrupter is installed in the electrical supply circuit.

6.0 CONCRETE CORE SAMPLING

NOTE - The core boring techniques discussed in this section should be supplemented as necessary with the information supplied by the drill rig manufacturer.

6.1 Locate the core drill equipment over the sample location. Attach the drill rig using HILTI (or equivalent) concrete anchor bolts per the manufacturer's recommendations.

6.2 Supply ASTM TYPE IV reagent grade water to the sample area and start the drill motor, lower the bit very slowly onto the surface to be drilled. Use light feed pressure until the bit crown has penetrated the surface approximately 1/4 inch.

6.3 Supply ASTM TYPE IV reagent grade water as necessary to keep the bit cool. Any liquid (water and concrete cuttings) slurry should be allowed to collect in the basin low point. This liquid may be absorbed and packaged as miscellaneous basin wastes per Storage/Disposal Approval Record (SDAR) # 6-1C-1AM-0 or solidified per DWP-H-026-00003.

6.4 For the first 2 or 3 inches, use light pressure to assure a gradual break-in of the diamond cutting edge. Remove periodically and feel the bit to assure that it is not overheating.

NOTE - If core bit is too hot to touch, use less feed pressure and more water. Remove outer gloves and feel the core drill bit using thin cloth gloves. If bit is wet, hand could get contaminated.

6.5 When correct feed pressure has been determined, maintain a constant pressure. Avoid jerky or in-and-out type feeding or the diamond cutting edge may crack.

NOTE - Too light a feed will polish diamonds and result in slow penetration. Excessively heavy feed will overheat the bit and cause the diamonds to pull out or overload the drill motor.

6.6 If reinforcement steel is contacted, reduce feed pressure. Continue penetration and increase cooling water flow as necessary.

CAUTION

Do not permit vibration or severe diamond breakage or pullout will occur.

6.7 Keep bit penetrating at all times or diamonds will polish. If bit does not penetrate, DO NOT FORCE IT, remove from hole and examine immediately. If the diamonds on the cutting edge are flush with the metal, they are underexposed and the bit should be sharpened per Section 7.0. Underexposure is caused by too much water or too little feed pressure. If the diamonds are exposed but shiny, they are polished. In this case, use more feed pressure or resharpen bit per Section 7.0. In either case, another bit should be installed and continue the drilling.

6.0 CONCRETE CORE SAMPLING (Cont'd)

6.8 When the 5-inch penetration mark is flush with the concrete surface stop drilling. Allow immediate access by the sampling team to collect the concrete sample.

6.9 After the collection of each coring, install a clean bit (decontaminated per Attachment 3). If another sample is required from this location (per Attachment 3), proceed as follows, if not go to Step 6.11. After the first sample has been collected, loosen the hold down HILTI bolt nut and rotate the drill stands about an inch and a half in either direction, and then re-tighten hold down bolt nut. The new position should be chosen, whenever possible, to both move away from any reinforcing steel encountered in the first hole, yet be close enough to the first hole so that some breakthrough between the holes will occur when the subsequent hole is drilled. In any case, the subsequent holes shall be within 9 inches of the first.

6.10 If the additional hole locations are on the floor and chosen so that breakthrough between the holes is expected, fill the first hole with ASTM TYPE IV reagent grade water. Regardless of whether breakthrough is anticipated or not, repeat steps 6.2 through 6.8 to complete the second coring operation at this location.

Environmental Engineering will arrange for and manage the transportation of samples to the K-25 Laboratory, the 325 Laboratory, and the 222-S Laboratory. All samples will be under chain of custody, either WHC or Martin-Marietta, and copies of these chain of custody forms will be forwarded to OSM (Gordon Blewitt) as the final step in the sample shipment to the laboratories.

6.11 When the required samples have been taken from a particular location, change to a clean (decontaminated per Attachment 3) drill bit. Resharpen the dirty bit per Section 7.0, and place in storage pending decontamination per Attachment 3. Return to step 5.2 or 5.3 as necessary to collect samples from the next designated location as directed by the Field Team Leader.

7.0 SHARPENING CORE DRILL BITS

Bits can be sharpened by drilling into concrete blocks with water. Following resharpening, bits shall be decontaminated per Attachment 3. Sharpening techniques presented here may be supplemented with techniques as presented in the equipment instruction manual.

7.1 Start drill into concrete (not an identified sample location) using water.

7.2 Reduce water usage until it becomes very muddy. Continue using as little water as possible until penetration increases.

7.3 If drill does not open up, remove it from the hole. Pour into the groove a thick layer of sand, silicon carbide, or garnet (the coarser the better).

7.4 Resume drilling with a minimum of water until the drill motor strains, then withdraw bit. Allow sludge to settle, then repeat 5 to 10 times. Do not over stress drill motor or bit.

7.5 Alternate: Drill several holes through a new cinder block or abrasive type brick or use light pressure on an abrasive grinding wheel.

7.6 After the bit is resharpened and prior to reuse, have the bit decontaminated per Attachment 3.

8.0 SAMPLE LOCATION ABANDONMENT

The following steps shall be taken on each of the sample holes bored into the basin floors and on the walls within three feet of the sedimentation floor. The background holes on the exterior south wall of the basins and any sample holes above this three foot line do not require grouting, since there in negligible chance of precipitation infiltration in these location.

8.1 Use a wire brush to roughen the area around the hole prior to grout placement. Mix grout per the manufacturers recommendations and then fill sample hole with grout. Feather the edges of the grout into the concrete as necessary.

9.0 DECONTAMINATION OF CORE DRILL RIG

The core drill rig shall be decontaminated or wiped down prior to daily use or long term storage. Decontamination or cleaning work shall be performed within the confines of a designated area within the 183-H Basins.

9.1 Wipe down the drill rig and motor daily. If full cleaning is deemed necessary, or at the end of the sampling effort proceed per the following steps.

9.2 Arrange absorbent pillows in a circle to confine the rinsate.

9.3 If practicable, position piece to be cleaned over an open polyethylene-lined 55 gallon drum. The purpose of the drum is to catch the rinsate.

9.4 Clean the exterior of the core drill rig, as necessary.

9.5 Rinsate shall be collected and disposed of per DWP-H-026-00003.

9.6 If the drill rig is to go into storage, label the rig to identify and indicate the decontamination date.

10.0 WORK COMPLETION

		INITIAL	DATE
10.1	Sample locations are identified per Attachment 1		
10.2	Collect the background samples per Sections 5 and 6		
10.3	Collect Basin 1 samples per Sections 5 and 6		
10.4	Collect Basin 2 samples per Sections 5 and 6		
10.5	Collect Basin 3 samples per Sections 5 and 6		
10.6	Collect Basin 4 samples per Sections 5 and 6		
10.7	Abandon the sample holes as outlined in Section 8		

ATTACHMENT 1

CONCRETE SAMPLING TEXT AND FIGURES FROM THE CLOSURE PLAN

This attachment consists of the text and figure directly out of the 183-H Solar Evaporation Basins Closure Plan (DOE/RL-880-04). Minor deviations from and clarifications to the Closure Plan are italicized for identification purposes.

183-H Basins' Concrete Structural Component Sampling--The 183-H Basins are four concrete-walled rectangular basins which held liquid wastes and sludges. The sampling, analysis, and characterization of the sludges in basin number 1 are described in Appendix B *(of the 183-H Closure Plan DOE/RL-88-04)*. The sampling, analysis, and characterization of wastes from basin numbers 2, 3, and 4 are described in Appendix H *(of the 183-H Closure Plan DOE/RL-88-04)*. The waste characteristics are summarized from the site characterization reports as follows:

Waste Types	Basin Numbers 1	2	3	4
Discarded chemical product	EH[a] EH	EH	EH	
Dangerous waste mixture	EH	EH	EH	EH
Dangerous waste characteristics: Liquid (based on chromium)	Toxic	Toxic WT01	Toxic WT01Q	Toxic WT01

[a]EHW = extremely hazardous waste.

The basin waste sludges and liquids have been removed, stabilized/solidified, and placed in drums for storage. Basin walls and floors *have been* decontaminated to remove residues *in basins number 1 and 4. Decontamination of basins number 2 and 3 is on hold pending the outcome of the concrete sampling effort*. The sampling plan includes samples of the walls and floors to evaluate the effectiveness of decontamination *(in basins numbers 1 and 4)* and to document residual contamination. Sampling of the basin walls and floors will be performed using the 'stratified random' sampling technique described in SW-846. The four identified strata are the sedimentation basin floors, the flocculation basin floors, the basin walls that have been exposed to liquid wastes, and the walls above the liquid wastes' high-water mark. These strata were chosen on the basis of the relative exposure to liquids and sludges. Sedimentation basin floors have been exposed to sludge with the hydraulic pressure produced by the highest liquid waste levels above the sludge. Flocculation basin floors in some basins have either not been exposed to heavy sludge deposits or have been exposed to lower liquid waste hydraulic pressure. Basin walls below the 'high-water marks' have been exposed primarily to liquid wastes. Walls above the 'high-water marks' have not been extensively exposed to wastes but may be contaminated due to evaporation vapors.

In each of the four 183-H basins, a minimum of 21 concrete samples will be taken as shown in *Figure 1-1*. Five of the sample locations in the basin floor have been randomly selected. The sixth is an authoritative (nonrandom) point located near each basin's low point. The four flocculation floor samples are all random. A second authoritative point *(chosen by the Field Team Leader)* will be field located on a fracture or crack in the floor or wall of each basin. A total of ten randomly selected sample locations have been

Figure 1-1. Number of Concrete Samples, Duplicates, and Blanks for 183-H Basins.

	Concrete	Duplicate[a]	Blanks[a] Trip	Field	Equipment	Total
Background	8	1	1	1	1	12
Subtotal						
Basin 1						
Sedimentation Floor	6					
Flocculation Floor	4					
Crack	1					
Upper Walls	5					
Lower Walls	5					
Subtotal	21	1	1	1	1	25
Basin 2						
Sedimentation Floor	6					
Flocculation Floor	4					
Crack	1					
Upper Walls	5					
Lower Walls	5					
Subtotal	21	1	1	1	1	25
Basin 3						
Sedimentation Floor	6					
Flocculation Floor	4					
Crack	1					
Upper Walls	5					
Lower Walls	5					
Subtotal	21	1	1	1	1	25
Basin 4						
Sedimentation Floor	6					
Flocculation Floor	4					
Crack	1					
Upper Walls	5					
Lower Walls	5					
Subtotal	21	1	1	1	1	25
Total	92	5	5	5	5	112

[a] SW-846 guidance for representative duplicates and blanks, which Ecology tentatively approved, is minimally 5 percent of total sampling or one set per week. The values shown in this table reflect the minimum number of duplicates and blanks to be taken. Additional duplicates and blanks may be taken at the discretion of the field team leader. *NOTE: See exceptions to blank requirements in section 1.0.*

identified for each of the four walls of each basin; five from the upper portion of the wall, above; the high-liquid level, and five from below this mark. Duplicate samples and blanks will be taken as discussed earlier *in Attachment 3* and shown in *Figure 1-1*. Also, five additional secondary samples will be taken, two from the sedimentation basin of basin 2 and three from the flocculation basin of basin 3. These are the total number of secondary locations in those portions of the basins. The total number of core samples is 114.

Sample locations have been determined by the intersection of vertical and horizontal grid lines (2-foot spacing) for walls and by north-south and east-west grid lines (5-foot spacing) for floors. Random numbers were used to first select a basin wall and then to choose the numbered grid lines for the sample locations in each strata. Intersecting grid lines then uniquely determine the sample locations. The sample locations are shown in *Figures 1-2 through 1-6*.

Concrete Background Samples--Concrete background samples will be taken from the exposed south-facing exterior wall at the extreme south end of the basins. The randomly chosen sample locations are shown in Figure *17*.

Twelve background samples (including one duplicate sample and three blanks) will be taken. Blanks will be taken as described in *Attachment 3* and as shown in Table *1-1*. Background sampling requirements are currently under review by Westinghouse Hanford and the DOE-RL, and a proposed Hanford Site policy for establishing the minimum number of samples is contemplated. For the 183-H Basins, the selection of the number of background samples has been based on standard engineering practices, EPA guidelines, and professional judgement.

The field location of the background sampling area was established by viewing the exterior southwest corner of the 183-H basins, and it was noted that the southern exterior of basin number 4 has a prominent vertical line running the height of the wall to form the imprint of the concrete forms. The area from which background samples will be collected, is a rectangle beginning at the top of the wall, extending down the vertical line for 10 feet, and transversing horizontally east for 150 feet; this yields a sample collection area that is 10 feet by 150 feet. Sample locations were selected at the intersection of horizontal and vertical grid line space at 5-foot and 2-foot intervals, respectively. Random numbers were used to select the specific intersections.

The exterior south wall of the 183-H basins has been justified as the source of the concrete background samples because it is physically separated from the waste containment walls by the effluent flume and the overflow flume, and the concrete was poured at the same time as the basins. The effluent flume and the overflow flume never received basin wastes because the waste levels never reached the lip of the overflow flume, so the background sampling walls were never affected by liquid wastes migrating through the concrete walls. Additionally, it is the exterior side of the wall that will be used to established background values, so liquid vapor contamination would have been unlikely.

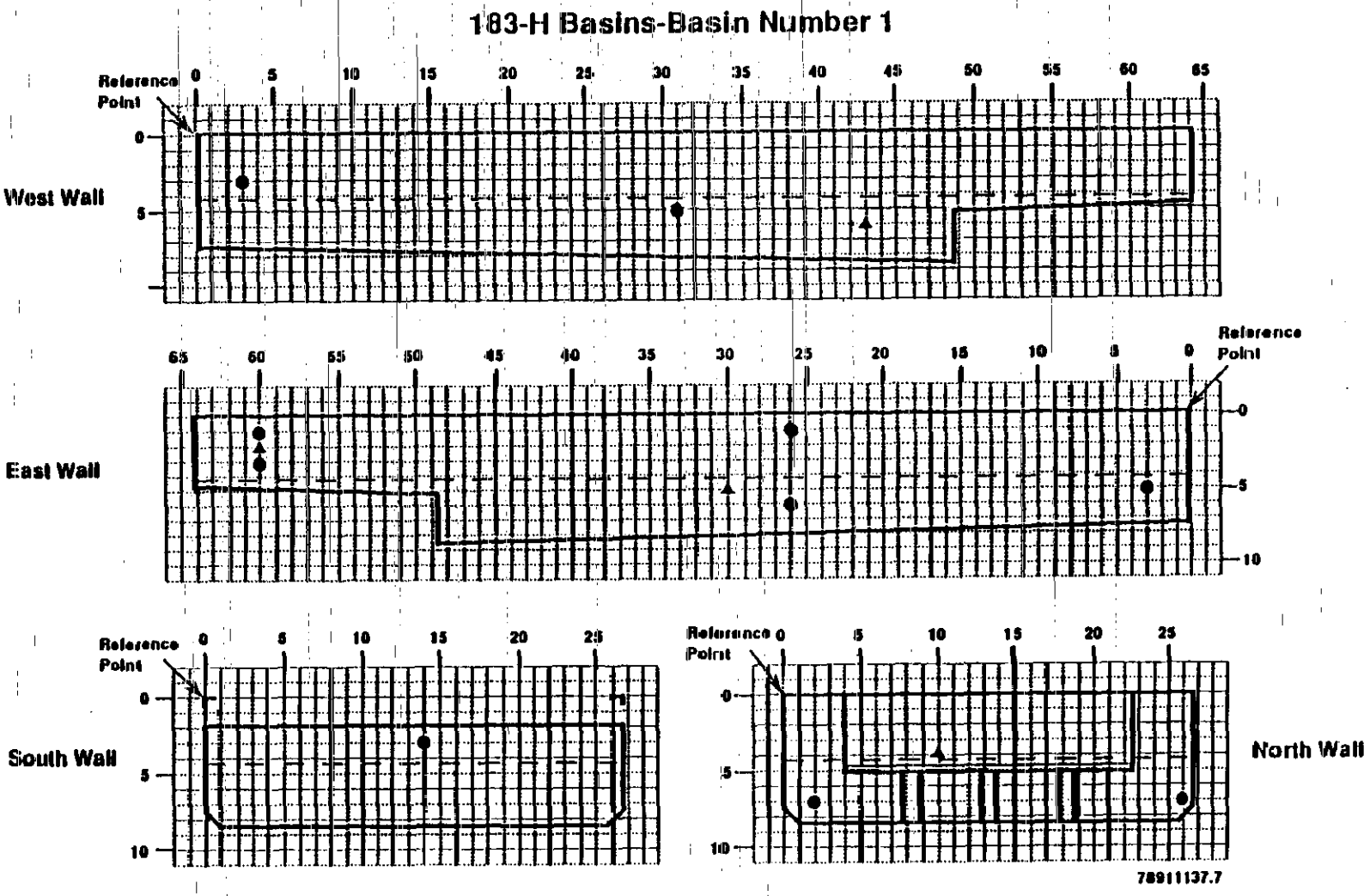


Figure 1-2. Concrete Sampling Locations for Basin 1.

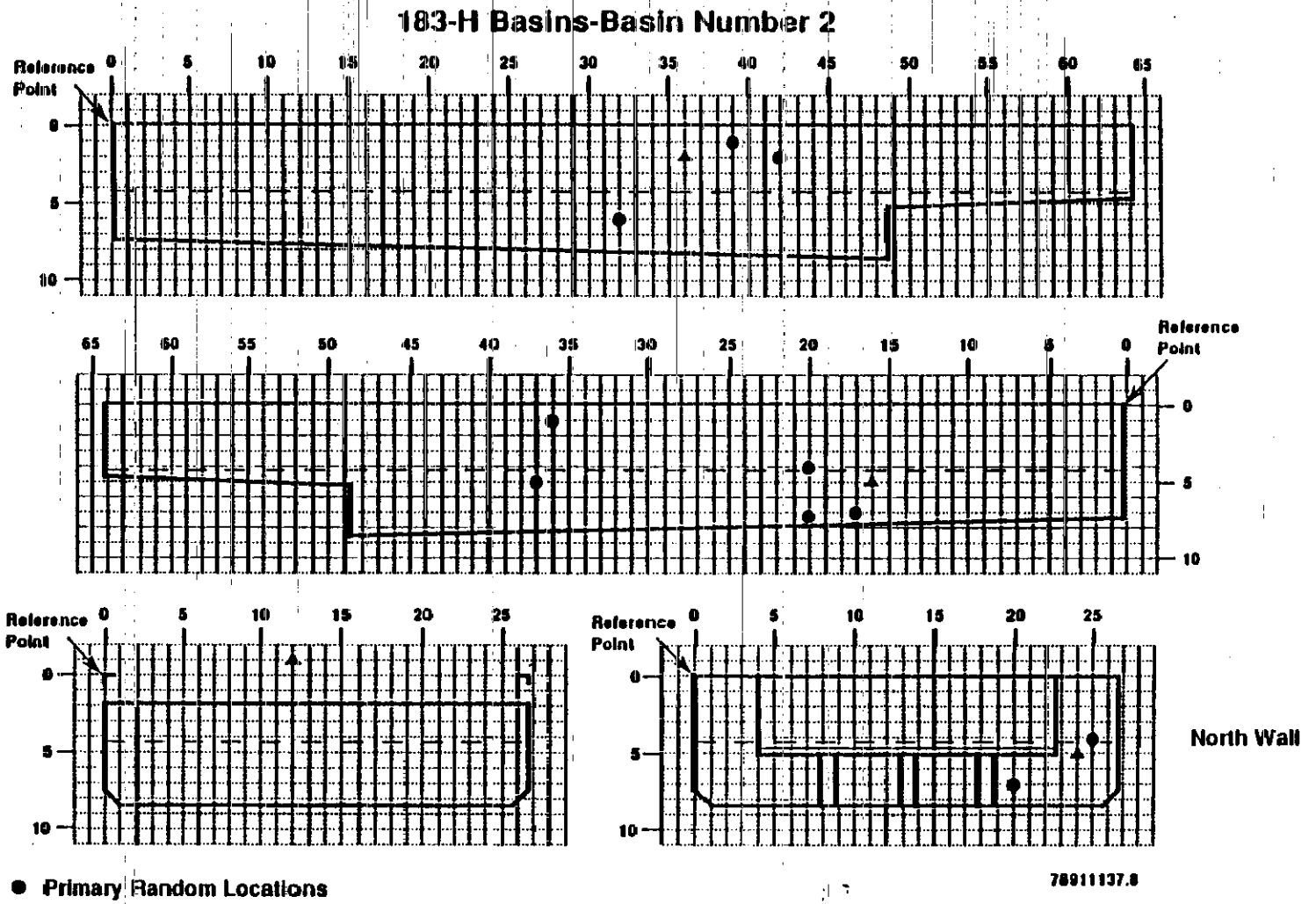


Figure 1-3. Concrete Sampling Locations for Basin 2.

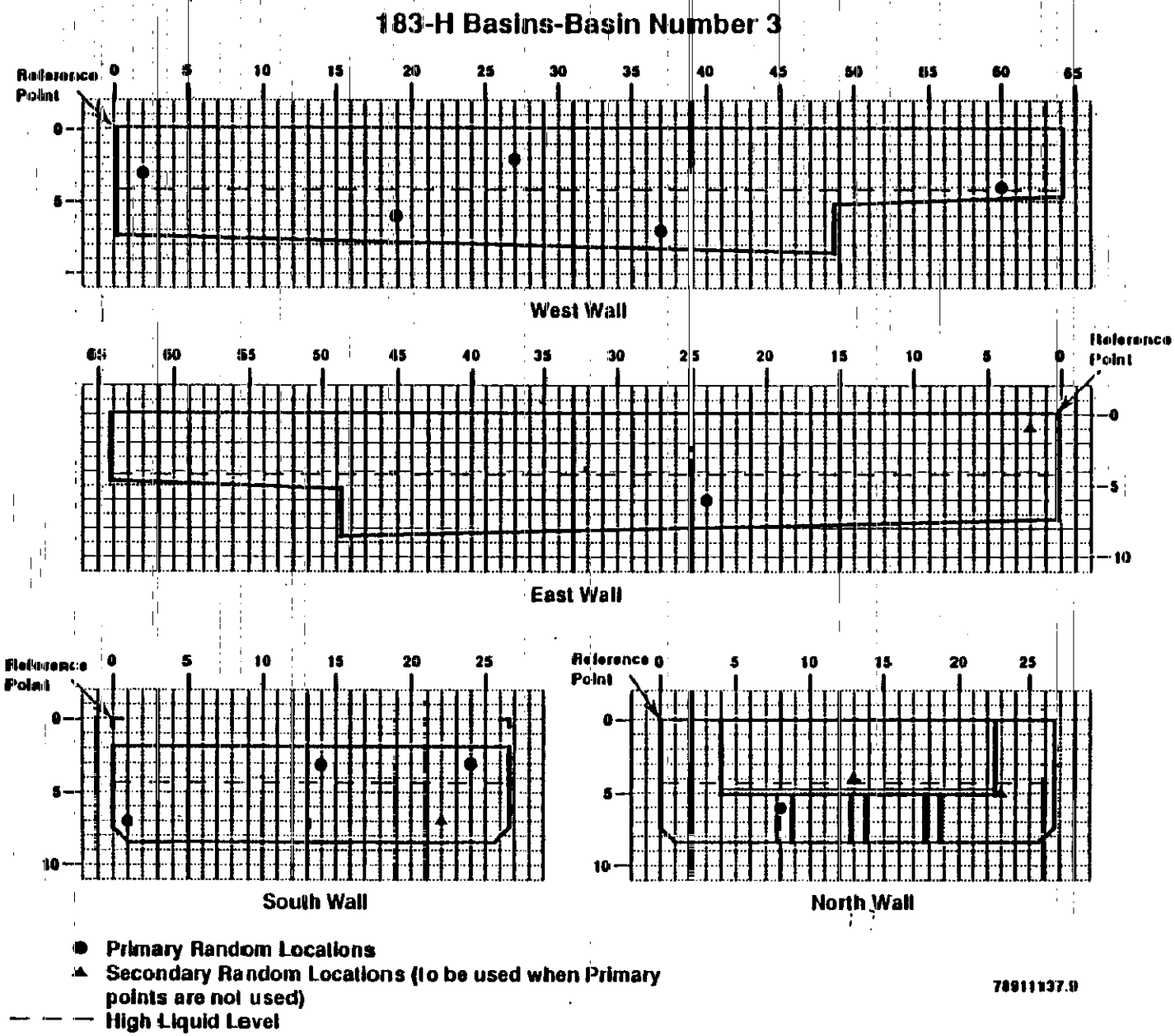


Figure 1-4. Concrete Sampling Locations for Basin 3.

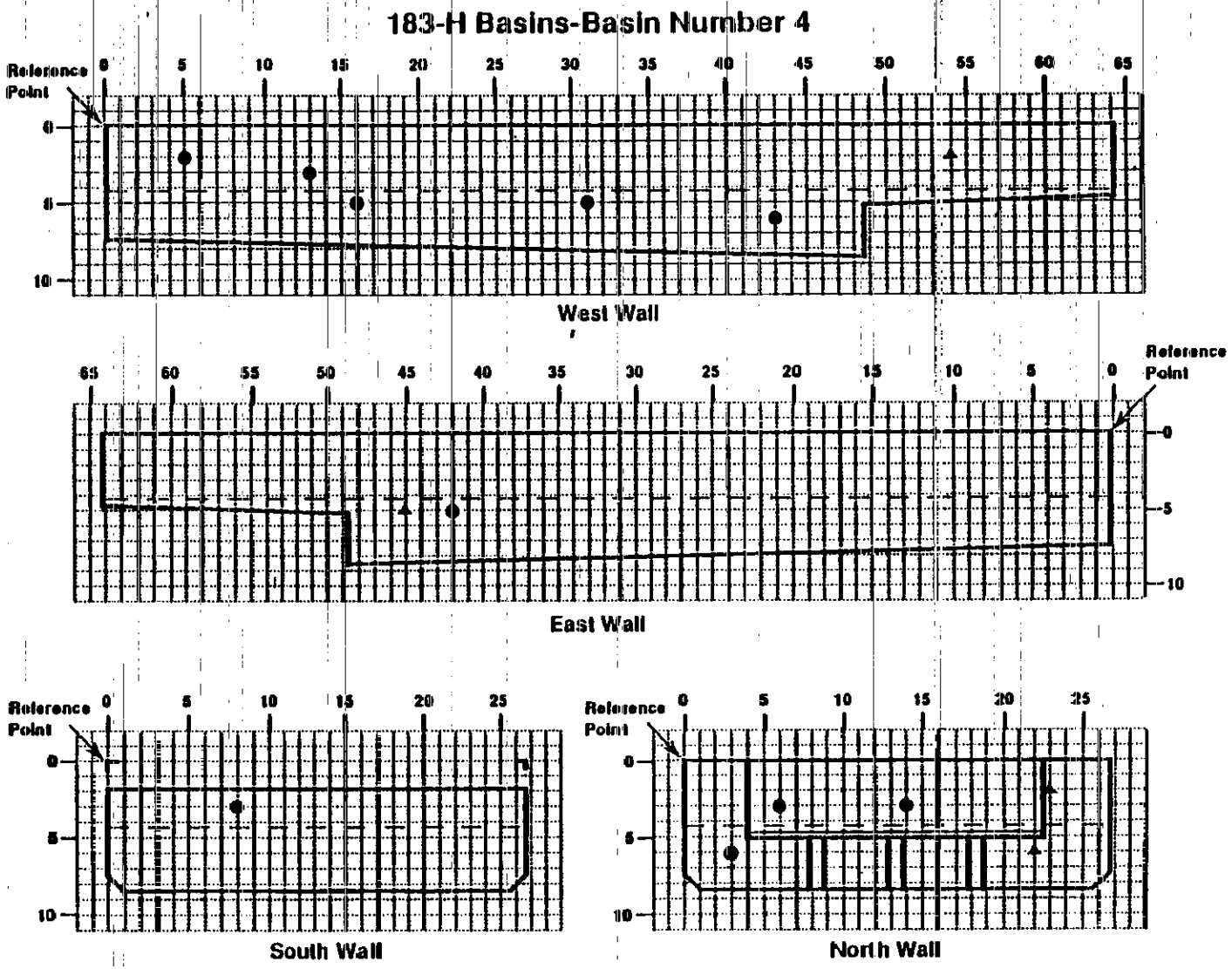


Figure 1-5. Concrete Sampling Locations for Basin 4.

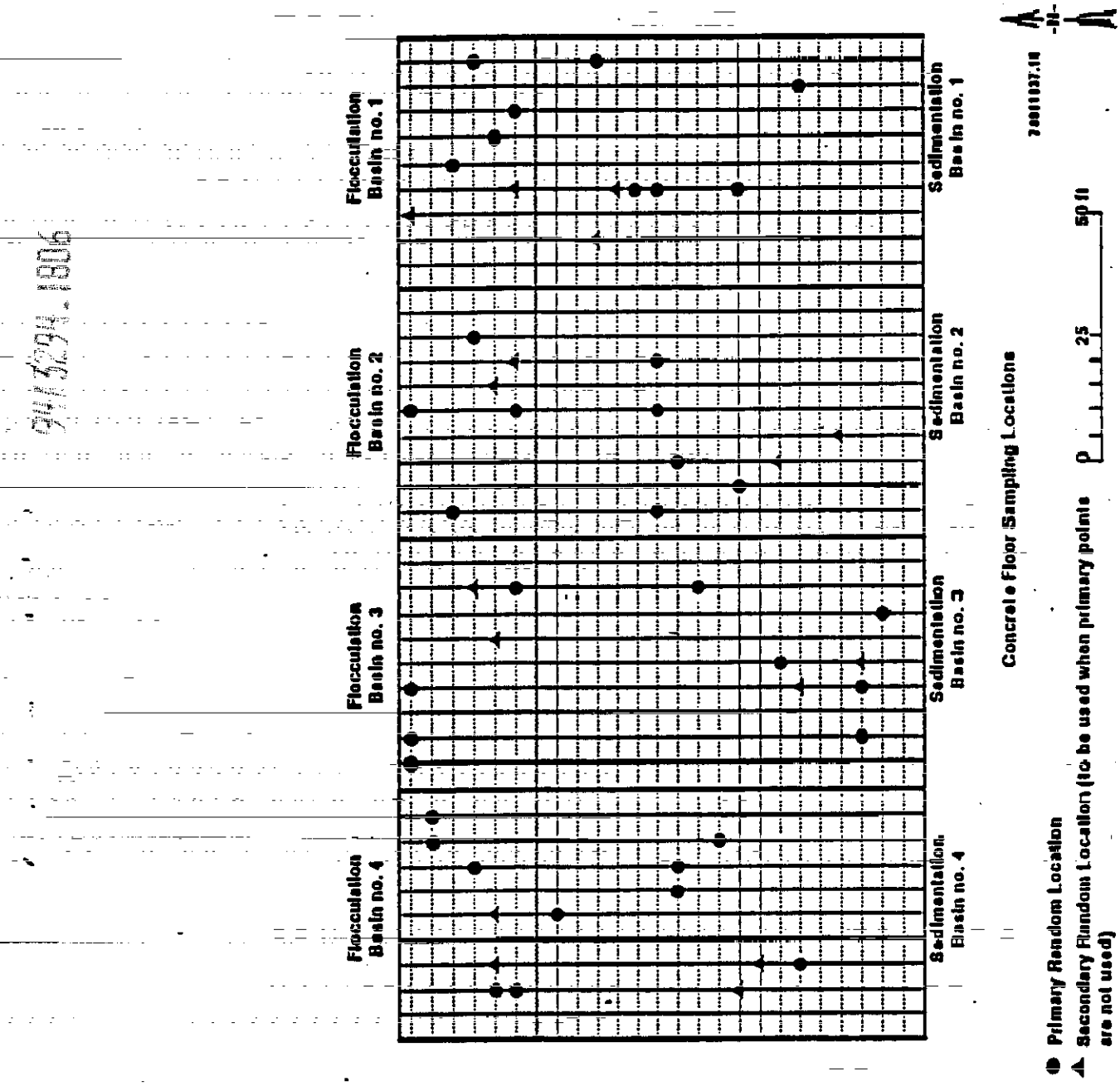


Figure 1-6. Concrete Floor Sampling Locations for 183-H Basins.

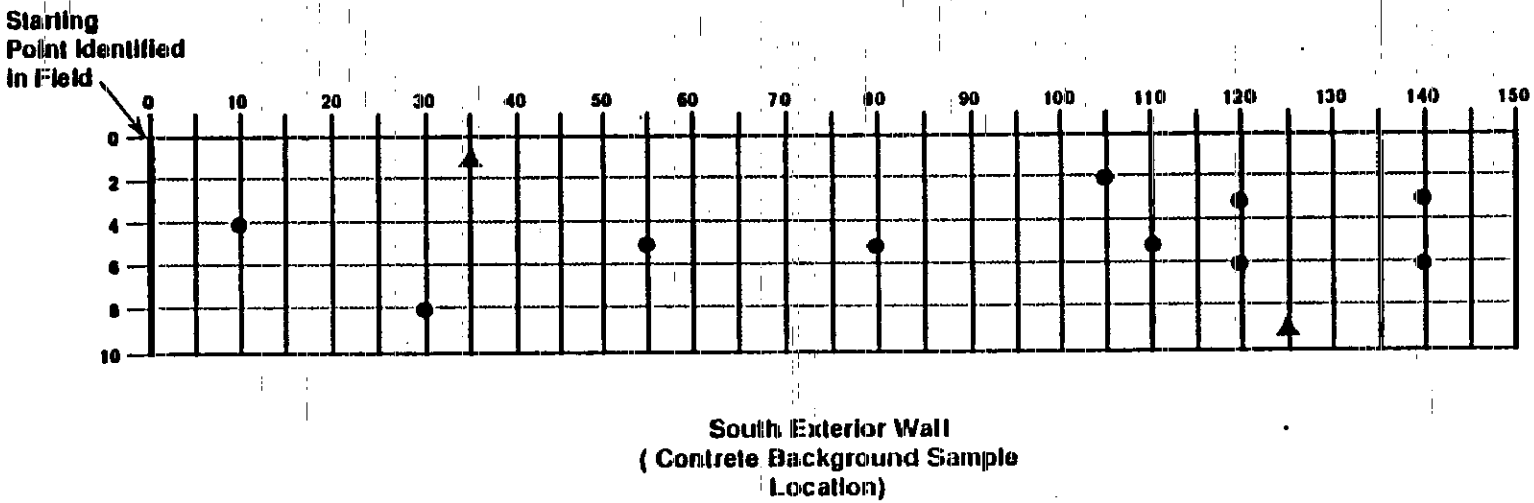


Figure 1-7. Background Concrete Sampling Locations.

Concrete Sampling Technique--The weight of concrete needed from each sample point is a minimum of 5 ounces. Removal of the concrete samples will be performed 'dry' to eliminate any pre-analysis leach or contamination effects by coring or cutting lubricants. Concrete samples may be collected by chipping or coring. For chipping, a concrete sample will be extracted from the surface by cutting a set of parallel groves about 1.63 to 2 inches apart and 10.5 inches long in the surface. The grooves will be cut at least 2 inches deep and one groove will be angled at about 30 degrees toward the other to yield a narrow triangular sample segment between the bottoms of the grooves. Cross-grooves perpendicular to the ends of the sample grooves will permit the sample to be broken by prying out from the surface to yield a prism-shaped sample piece with an intact surface layer.

Commercial equipment for cutting grooves is available. The equipment operates dry by pneumatically driven impact bits. The bits are readily cleaned to eliminate cross-contamination between samples. Concrete core drilled samples (1-inch t 3-inch diameter) may be taken from the floor or walls. Commercial coring equipment is readily available and can be cleaned to prevent cross contamination between samples. *Concrete drilled samples (2 inches) is the method chosen for implementation of the concrete sampling effort. See Attachment 3 for specific direction on coring equipment cleaning.*

ATTACHMENT 2 - REQUESTED ANALYSES

Table 2.1 and 2.2 list those analyses that will be requested for each of the concrete samples.

TABLE 2.1

ANALYTE	EXPECTED RANGE mg/kg	REQUESTED METHOD	REQUESTED DETECTION LIMIT mg/kg
Arsenic	unknown	7060 or 7061	0.2
Barium	unknown	3050/6010	20
Beryllium	unknown	3050/6010	0.5
Cadmium	unknown	3050/6010	0.5
Chromium	unknown	3050/6010	1.0
Copper	unknown	3050/6010	2.5
Fluoride	unknown	Ion Chroma-tography	1.0
Lead	unknown	7421	0.1
Manganese	unknown	3050/6010	50
Mercury	unknown	7471	0.2
Nickel	unknown	3050/6010	4.0
Nitrate	unknown	300.0	1.0
Nitrite	unknown	300.0	1.0
Selenium	unknown	7740 or 7741	0.5
Silver	unknown	3050/6010	1.0
Sodium	unknown	3050/6010	25
Sulfate	unknown	300.0	1.0
Vanadium	unknown	3050/6010	2.0
Zinc	unknown	3050/6010	2.0
Cyanide *	<detectable	9010	
Formate *	<detectable	AL0212 (at 325 Lab)	
pH	4 to 10 pH units	EPA 9045	NA

* These analyses will be performed on only 10 of the samples. Those ten locations will be chosen from the floors or each of the basins and the background locations. Specific points will be chosen by the Field Team Leader and documented in the Field Notebook.

TABLE 2.2

ANALYTE	EXPECTED RANGE pCi/g	REQUESTED DETECTION LIMIT pCi/g	COMMENTS
Total U	[0.1 - 1.1 ugm/g]	0.1	Method should be EPA 908 (K-25)
Tc-99	[< 1.7]	1	Method should be TP1628 (K-25).
Gross Alpha, Gross Beta, Gamma Scan	[≤200]	20	Method 9310 for Gross Alpha and Gross Beta, Method 901.1 for Isotopic Gamma Scan.

ATTACHMENT 3

183-H SOLAR EVAPORATION BASIN CORE-DRILL

CONCRETE COMPONENT SAMPLING PLAN

ENVIRONMENTAL ENGINEERING

APRIL 2, 1991

183-H SOLAR EVAPORATION BASIN CORE-DRILL CONCRETE COMPONENT SAMPLING PLAN

1. SCOPE/PURPOSE

The scope of this sampling effort is to collect concrete samples for site characterization to meet the requirements of the "Concrete Structural Component Sampling" section of the 183-H Solar Evaporation Basin Closure Plan.

2. SAMPLING TEAM

To ensure a safe and organized field sampling job, the designated field team leader and sampler(s) will be responsible to see that all field activities are conducted in accordance with the procedures outlined in WHC-CM-7-7, Environmental Investigations and Site Characterization Manual (WHC 1989). The Field Team Leader is responsible for all documentation required to provide verification and traceability of all samples and associated activities. Documents to be included and maintained according to Westinghouse Hanford Company (WHC) manual requirements are:

- Registered field logbook
- Chain-of-custody with appropriate signatures
- Sample analysis request forms
- Copy of sampling plan
- Hazardous Waste Operations Permit (HWOP)

3. SAMPLING EQUIPMENT

Decontamination stainless steel equipment to be utilized for sample collection may include the following: spoons, scoops, bowls, and push rods for sample extrusion.

A sufficient quantity of each item will be available for use at each individual sample site to prevent cross-contamination of samples. The following is a brief list of sampling materials to be utilized in this sampling effort:

- 60/120/250/500-ml plastic jars
- 120/250-ml amber glass jars
- Sample jar labels

- Protective gloves
- Ice chest with wet and "blue" ice
- Absorbent (vermiculite) for shipping
- Permanent marking pens
- Plastic sealer bags
- Evidence tape
- Other items as needed

4. DATA QUALITY OBJECTIVES

4.1. ANALYTICAL LEVELS

The U.S. Environmental Protection Agency (EPA) guidance (1987) provides five analytical levels for environmental characterization. These definitions describe categories of analysis and are used for reference in this document. The analytical levels are summarized as follows:

- Level I, Field Screening--generally using hand-held equipment.
- Level II, Field Analyses--using portable analytical instruments, usually in a mobile laboratory.
- Level III, Laboratory Analysis--quantitative analysis using standard, documented laboratory procedures.
- Level IV, Laboratory Analysis--quantitative analysis using procedures which follow stringent quality assurance and quality control protocols and documentations.
- Level V, Laboratory Analysis--nonstandard methods or special analytical services.

All onsite personnel health and safety screening will be conducted at the Level I category, as per the HWOP. Level II analyses may be utilized to determine acceptable radionuclide values to meet shipping requirements. All laboratory analysis for samples shall be performed to Level III requirements. The procedures will follow the chemical analysis methods and protocols established EPA manual SW-846, Test Methods for Evaluation of Solid Waste (EPA 1986b); except where noted in Table A-1.

4.2. CONTAMINANTS OF CONCERN

The 183-H Solar Basin Closure Plan enumerates the constituents listed in Table A-1 as the contaminants of concern for analysis in the concrete cores from the basin.

TABLE A-1 ANALYTICAL METHODS FOR CONCRETE SAMPLE ANALYSIS

Constituent	Analytical Method
Arsenic	SW-846, 6010
Barium	SW-846, 6010
Beryllium	SW-846, 6010
Cadmium	SW-846, 6010
Chromium	SW-846, 6010
Copper	SW-846, 6010
Lead	SW-846, 6010
Manganese	SW-846, 6010
Mercury	SW-846, 7471
Nickel	SW-846, 6010
Selenium	SW-846, 6010
Silver	SW-846, 6010
Sodium	SW-846, 6010
Vanadium	SW-846, 6010
Zinc	SW-846, 6010
Fluoride	EPA 300
Nitrate	EPA 300
Sulfate	EPA 300
Uranium (total)	EPA 908
Technetium-99	TP 1628
Gross alpha	SW-846, 9310
Gross beta	SW-846, 9310
Gamma scan	SW-846, 901.1
Formate	EPA 9045
pH	

Note: Although Vanadium is listed as a waste, it has never been found in any waste designation sampling.

5. FIELD SAMPLING METHODOLOGY

5.1. SAMPLING LOCATIONS

The objective of the basin concrete core sampling is to determine whether contaminated liquids have permeated the concrete walls of the basin; and if so, what the distribution of the contamination may be. Random and authoritative samples will be collected from the locations noted and discussed in the decommissioning work plan text (figures).

Additional, discretionary sampling locations may be determined onsite by the Field Team Leader. Factors influencing selection of discretionary sampling locations may include evidence of contamination and similar inconsistencies that may indicate contamination.

5.2. SAMPLE COLLECTION

All concrete core samples will be collected according to the applicable protocols outlined in WHC-CM-7-7, EII 5.2, "Soil and Sediment Sampling." The location of each sample point will be verified by sampling personnel prior to collection. At each sampling point a 2 in. by 5 in. (approximately) long core will be collected in order to provide the 300 to 400 grams of material required for analyses. The sample material will be extruded from the core drill and placed in clean containers. All sample preparation which may be required (e.g., drying, grinding, screening, constituent separation) will be conducted by the receiving laboratory. Upon securing the sample and cleaning the exterior of all containers, the sample will be returned to the Field Team Leader and the sampler will verify time of collection, sample location, field conditions and any other pertinent information. Containers will be labeled and place on ice. Prior to shipping, sample containers will be checked for sample integrity secured with evidence tape and bagged to meet appropriate shipment requirements.

5.3. FIELD LOGBOOKS

A field logbook will be kept in accordance with the protocols outlined in WHC-CM-7-7, EII 1.5, "Field Logbooks."

5.4. CHAIN-OF-CUSTODY

To establish the documentation necessary to ensure the traceability of samples from time of collection, WHC-CM-7-7, EII 5.1, "Chain-of-Custody," will provide procedures for sample security. A copy of the WHC chain-of-custody form is show in Figure A-1.

5.5. SAMPLE ANALYSES

An approved laboratory will be selected to conduct the analyses indicated in Table A-1. Request for appropriate analyses will be included on the WHC Sample Analysis Request form (Figure A-2) as provided in WHC-CM-7-7, EII 5.2. Laboratory specific forms may be required and will be supplied by the Office of Sample Management.

5.6. DECONTAMINATION

All equipment which is utilized for direct collection of samples will have been previously cleaned in accordance with WHC-CM-7-7, EII 5.5, "Decontamination of Equipment for RCRA[1]/CERCLA[2] Sampling." Core drilling bits which have received a radiation release may also be decontaminated according to this method or may be field decontaminated at the discretion of the Field Team Leader.

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[1]Resource Conservation and Recovery Act.

[2]Comprehensive Environmental Response, Compensation, and Liability Act.

Westinghouse Hanford Company	CHAIN OF CUSTODY

Company Contact _____ Telephone _____

Sample Collected by _____ Date _____ Time _____

Sample Locations _____

Ice Chest No. _____ Field Logbook and Page No. _____

Remarks _____

Bill of Lading No. _____ Offsite Property No. _____

Method of Shipment _____

Shipped to _____

Possible Sample Hazards _____

Sample Identification

SAMPLE

Chain of Possession

Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

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Figure A-1. Chain-of-Custody Form.

Westinghouse Hanford Company	SAMPLE ANALYSIS REQUEST

PART I: FIELD SECTION

Collector _____ Date Sampled _____ Time _____ hours

Company Contact _____ Telephone (____) _____

Sample Number	Number and Type of Sample Containers	Type of Sample*	Analysis Requested

Field Information** _____

Special Handling and/or Storage _____

Possible Sample Hazards _____

PART II: LABORATORY SECTION

Received by _____ Title _____ Date _____

Analysis Required _____

*Indicate whether sample is soil, sludge, water, etc.

**Use back of page for additional information relative to sample location.

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Figure A-2. Sample Analysis Request Form.

When field decisions are made by the Field Team Leader, necessary actions will be recorded in the field logbook along with circumstances requiring the action.

Circumstances or changing objectives may require major modifications of the basic sampling plan. In this situation, the Field Team Leader will submit the following information to the Cognizant Engineer for approval and inclusion in the Project File.

- sampling plan title
- section/subsection to be modified (chapter, title, page number), quoting section as given in sampling plan
- modifications or deviations, recording modified, deleted, or added statement
- technical summary of change
- approvals by original signers of the document or appropriate replacement

5.8. QUALITY ASSURANCE

Quality Assurance will be achieved through several areas which can include:

- Documentation (e.g., field logbook, chain-of-custody)
- Proper sample collection protocol
- Collection of excess co-located duplicates to confirm laboratory and field actions did not affect analysis results.

Quality control samples will be collected in accordance with SW-846 guidelines, where applicable. Quality control samples will consist of duplicates, field blanks, and equipment blanks. At a minimum, one sample in 20 will be a co-located sample (2 in. diameter by 5 in. deep core) taken in the field, appropriately labeled, and treated as a duplicate. In the event that the sampling rate is less than 20 samples per week, at least one duplicate sample will be collected per week. All samples will be submitted to the same analytical laboratory.

At least one field blank will be transported from the field to the laboratory for this sampling effort. Field blanks will be laboratory grade silica sand that does not come in contact with the concrete. They will be opened in the filed for about the same duration as one sample collecting period, closed, properly labeled, resealed, and transported to the laboratory with the field samples. Since the samples will not be laboratory tested for volatiles, no trip blanks will be used.

At least one equipment blank will be collected during this sampling effort. Equipment blanks will be identical to field blanks except that they will be opened in the field and poured over or through the sample collecting equipment before sampling.

5.9. SHIPPING

Before samples can be packaged and sent offsite, they will be held until released following completion of a radiological survey, according to applicable regulations for offsite shipments. All shipping requirements will comply with WHC-CM-7-7, EII 5.11, "Sample Packaging and Shipping," (WHC 1989) with the shipping containers being inspected by a WHC traffic representative to ensure compliance with the U.S. Department of Transportation requirements. Delays at WHC shipping can be avoided or minimized by completing the following tasks:

- Inform WHC shipping at least one day prior to samples being shipped.
- Have sample containers at WHC shipping around 1300 hours

Items to be checked for completion before sample containers are released to shipping personnel are:

- Copies of chain-of-custody and sample analysis forms attached to inside of ice chest lid
- Identify shipping container with appropriate markings and labels (e.g., "This End Up" stickers)
- Seal the ice chest lid with tape; sign and date

6. PERSONNEL TRAINING

As the primary means of protecting the health and safety of field personnel all individuals who enter the controlled zones will have received the appropriate training to be qualified as a "Hazardous Waste Worker" as outlined in EII 1.1, "Hazardous Waste Site Entry Requirements".

7. JOB SAFETY REQUIREMENTS

The primary guidance for all site-safety related concerns and requirements will be designated in the Hazardous Waste Operations Permit (HWOP) as outlined in EII 2.1, "Preparation of Hazardous Waste Operations Permits". Job specific related activities will be delineated in the HWOP and will provide guidance for appropriate personnel protection equipment (PPE), site monitoring, chemical/radiological hazards and potential safety hazards associated with the field/site environment.

All safety-related documents and sampling plans will be reviewed by field personnel prior to work commencement. A pre-job safety meeting and regular field-safety "tailgate" meetings will be held to review all safety considerations and identify any potential hazards not previously noted.

8. REFERENCES

EPA 1983, Standards Methods for Chemical Analysis of Water and Waste Water, EPA 600/4-79-026, U.S. Environmental Protection Agency, Washington D.C.

EPA 1986a, Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities, Title 40, Code of Federal Regulations, Part 264, U.S. Environmental Protection Agency, Washington, D.C.

EPA 1986b, Test Methods for Evaluating Solid Waste - Physical/Chemical Methods, SW-846, 3rd Edition, U.S. Environmental Protection Agency, Washington, D.C.

EPA 1987, Data Quality Objectives for Remedial Response Activities, U.S. Environmental Protection Agency, Washington, D.C.

WHC 1989, Environmental Investigations and Site Characterization Manual, WHC-CM-7-7, Westinghouse Hanford Company, Richland, Washington.